

# ILNAS

Institut luxembourgeois de la normalisation  
de l'accréditation, de la sécurité et qualité  
des produits et services

**ILNAS-EN 388:2016+A1:2018**

## **Protective gloves against mechanical risks**

Gants de protection contre les risques  
mécaniques

Schutzhandschuhe gegen mechanische  
Risiken

**12/2018**



## National Foreword

This European Standard EN 388:2016+A1:2018 was adopted as Luxembourgish Standard ILNAS-EN 388:2016+A1:2018.

Every interested party, which is member of an organization based in Luxembourg, can participate for FREE in the development of Luxembourgish (ILNAS), European (CEN, CENELEC) and International (ISO, IEC) standards:

- Participate in the design of standards
- Foresee future developments
- Participate in technical committee meetings

<https://portail-qualite.public.lu/fr/normes-normalisation/participer-normalisation.html>

### **THIS PUBLICATION IS COPYRIGHT PROTECTED**

Nothing from this publication may be reproduced or utilized in any form or by any mean - electronic, mechanical, photocopying or any other data carries without prior permission!

English Version

## Protective gloves against mechanical risks

Gants de protection contre les risques mécaniques

Schutzhandschuhe gegen mechanische Risiken

This European Standard was approved by CEN on 29 July 2016 and includes Amendment 1 approved by CEN on 24 October 2018.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.





EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

**Contents**

Page

European foreword.....	4
<b>1</b> <b>Scope</b> .....	<b>5</b>
<b>2</b> <b>Normative references</b> .....	<b>5</b>
<b>3</b> <b>Terms and definitions</b> .....	<b>6</b>
<b>4</b> <b>Requirements</b> .....	<b>7</b>
<b>4.1</b> <b>General</b> .....	<b>7</b>
<b>4.2</b> <b>Additional Protection</b> .....	<b>7</b>
<b>4.2.1</b> <b>General</b> .....	<b>7</b>
<b>4.2.2</b> <b>Impact protection</b> .....	<b>8</b>
<b>5</b> <b>Sampling and conditioning</b> .....	<b>8</b>
<b>6</b> <b>Test methods</b> .....	<b>8</b>
<b>6.1</b> <b>Abrasion resistance</b> .....	<b>8</b>
<b>6.1.1</b> <b>Principle</b> .....	<b>8</b>
<b>6.1.2</b> <b>Consumables</b> .....	<b>8</b>
<b>6.1.3</b> <b>Apparatus</b> .....	<b>9</b>
<b>6.1.4</b> <b>Test specimens</b> .....	<b>9</b>
<b>6.1.5</b> <b>Test procedure</b> .....	<b>9</b>
<b>6.1.6</b> <b>Test report</b> .....	<b>11</b>
<b>6.2</b> <b>Blade cut resistance</b> .....	<b>12</b>
<b>6.2.1</b> <b>Principle</b> .....	<b>12</b>
<b>6.2.2</b> <b>Equipment</b> .....	<b>12</b>
<b>6.2.3</b> <b>Test specimen</b> .....	<b>14</b>
<b>6.2.4</b> <b>Control specimen</b> .....	<b>15</b>
<b>6.2.5</b> <b>Canvas</b> .....	<b>15</b>
<b>6.2.6</b> <b>Test method</b> .....	<b>15</b>
<b>6.2.7</b> <b>Calculation of test results</b> .....	<b>16</b>
<b>6.2.8</b> <b>Test report</b> .....	<b>17</b>
<b>6.3</b> <b>Cut Resistance method (EN ISO 13997)</b> .....	<b>17</b>
<b>6.3.1</b> <b>General</b> .....	<b>17</b>
<b>6.3.2</b> <b>Test specimen</b> .....	<b>17</b>
<b>6.3.3</b> <b>Test report</b> .....	<b>17</b>
<b>6.4</b> <b>Tear resistance</b> .....	<b>18</b>
<b>6.4.1</b> <b>Principle</b> .....	<b>18</b>
<b>6.4.2</b> <b>Equipment</b> .....	<b>18</b>
<b>6.4.3</b> <b>Test specimen</b> .....	<b>18</b>
<b>6.4.4</b> <b>Setting up the test specimen</b> .....	<b>18</b>
<b>6.4.5</b> <b>Test method</b> .....	<b>19</b>
<b>6.4.6</b> <b>Test report</b> .....	<b>19</b>
<b>6.5</b> <b>Puncture resistance</b> .....	<b>20</b>
<b>6.5.1</b> <b>Principle</b> .....	<b>20</b>
<b>6.5.2</b> <b>Equipment</b> .....	<b>20</b>
<b>6.5.3</b> <b>Test specimen</b> .....	<b>21</b>
<b>6.5.4</b> <b>Test method</b> .....	<b>21</b>
<b>6.5.5</b> <b>Test report</b> .....	<b>21</b>
<b>6.6</b> <b>Impact Test</b> .....	<b>21</b>

<b>7</b>	<b>Marking</b> .....	<b>21</b>
<b>7.1</b>	<b>General</b> .....	<b>21</b>
<b>7.2</b>	<b>Pictograms</b> .....	<b>22</b>
<b>7.3</b>	<b>Marking of additional requirements</b> .....	<b>22</b>
<b>7.4</b>	<b>Examples of marking</b> .....	<b>22</b>
<b>8</b>	<b>Information supplied by the manufacturer in the user notice</b> .....	<b>23</b>
	<b>Annex A (normative) Abradant</b> .....	<b>24</b>
<b>A.1</b>	<b>Definition of the abradant</b> .....	<b>24</b>
<b>A.2</b>	<b>Acceptation criteria of the abradant</b> .....	<b>24</b>
	<b>Annex B (normative) Test results - Uncertainty of measurement</b> .....	<b>25</b>
	<b>Annex C (normative) Validation test for the adhesive used in EN 388, 6.1.2.2</b> .....	<b>26</b>
<b>C.1</b>	<b>Objective</b> .....	<b>26</b>
<b>C.2</b>	<b>Apparatus and materials</b> .....	<b>26</b>
<b>C.3</b>	<b>Preparation of test specimens</b> .....	<b>27</b>
<b>C.4</b>	<b>Test procedure</b> .....	<b>28</b>
<b>C.5</b>	<b>Examples of acceptable adhesive tape</b> .....	<b>30</b>
	<b>Annex ZA (informative)  Relationship between this European Standard and the essential requirements of REGULATION (EU) 2016/425 of the European Parliament and of the Council of 9 March 2016 on personal protective equipment aimed to be covered </b> .....	<b>31</b>

## European foreword

This document (EN 388:2016+A1:2018) has been prepared by Technical Committee CEN/TC 162 “Protective clothing including hand and arm protection and lifejackets”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document includes Amendment 1 approved by CEN on 2018-10-24.

This document supersedes **A1** EN 388:2016 **A1**.

The start and finish of text introduced or altered by amendment is indicated in the text by tags **A1** **A1**.

**A1** This document has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of Regulation (EU) 2016/425.

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document. **A1**

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## 1 Scope

This European Standard specifies requirements, test methods, marking and information to be supplied for protective gloves against the mechanical risks of abrasion, blade cut, tear, puncture and, if applicable, impact.

This standard is intended to be used in conjunction with EN 420.

The test methods developed in this standard may also be applicable to arm protectors.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 420, *Protective gloves — General requirements and test methods*

☐A1 EN 1049-2, *Textiles — Woven fabrics — Construction — Methods of analysis — Part 2: Determination of number of threads per unit length (ISO 7211-2:1984 modified)* ☐A1

☐A1 EN 12127, *Textiles — Fabrics — Determination of mass per unit area using small samples* ☐A1

EN 13594:2015, *Protective gloves for motorcycle riders — Requirements and test methods*

☐A1 EN ISO 5084, *Textiles — Determination of thickness of textiles and textile products (ISO 5084:1996)* ☐A1

EN ISO 7500-1, *Metallic materials — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system (ISO 7500-1)*

EN ISO 11644, *Leather — Test for adhesion of finish (ISO 11644)*

☐A1 CEN ISO/TR 11827, *Textiles — Composition testing — Identification of fibres* ☐A1

EN ISO 12947-1, *Textiles — Determination of the abrasion resistance of fabrics by the Martindale method — Part 1: Martindale abrasion testing apparatus (ISO 12947-1)*

EN ISO 13934-1, *Textiles — Tensile properties of fabrics — Part 1: Determination of maximum force and elongation at maximum force using the strip method (ISO 13934-1)*

EN ISO 13997:1999, *Protective clothing — Mechanical properties — Determination of resistance to cutting by sharp objects (ISO 13997:1999)*

☐A1 ISO 1139, *Textiles — Designation of yarns* ☐A1

ISO 4649:2010, *Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device*

ISO 5725-2, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

☐A1 ISO 7211-1, *Textiles — Woven fabrics — Construction — Methods of analysis — Part 1: Methods for the presentation of a weave diagram and plans for drafting, denting and lifting*

ISO 7211-4, *Textiles — Woven fabrics — Construction — Methods of analysis — Part 4: Determination of twist in yarn removed from fabric*

ISO 7211-5, *Textiles — Woven fabrics — Construction — Method of analysis — Part 5: Determination of linear density of yarn removed from fabric* <sup>(A1)</sup>

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

ISO/IEC Guide 98-4, *Uncertainty of measurement — Part 4: Role of measurement uncertainty in conformity assessment*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1 protective glove against mechanical risks

glove that provides protection against at least one of the following mechanical risks: abrasion, blade cut, tear and puncture

#### 3.2 glove providing a specific protection

glove that is designed to provide an area of improved protection for the whole hand or part of it

Note 1 to entry: For example, palm protection style or protection against impact.

#### 3.3 glove series

single glove style or glove type with the same palm material up to the wrist line where the only variants are size, length, left/right hand and colour

#### 3.4 arm

part of the body between the wrist and the shoulder

#### 3.5 gloves made from several layers

- unbonded layers: a glove that is made from 2 or more layers of materials which are not connected together, after preparing the sample for the test;
- bonded layers: a glove that is made from 2 or more layers of materials which are connected together (e.g. glued, stitched, dipped, impregnated) after preparing the sample for the test

#### 3.6 abrasion cycle

completion of all the translational abrasion movements tracing a Lissajous figure comprising 16 rubs, i.e. 16 revolutions of the two outer drives and 15 revolutions of the inner drive of the Martindale abrasion tester

[SOURCE: EN ISO 12947-1]

Note 1 to entry: An abrasion rub is one revolution of the outer drives of the Martindale abrasion tester (see EN ISO 12947-1).